stridor, cough, hemoptysis, or unresolved pneumonia or atelectasis may require immediate initial laser treatment because of life-threatening symptoms associated with a benign or malignant lesion in a major airway. Symptomatic relief from asphyxiation in a patient with endobronchial malignancy can be achieved for an average of six months.

Laser therapy is clinically justified for the initial treatment of benign tracheal stenosis due to an outgrowth of a fibrous web or diaphragm in symptomatic patients with severe air flow limitation who have not responded to mechanical dilatation. It can offer excellent palliative relief and in some cases be curative. Optimal results may ultimately require additional surgical resection or a Montgomery tube. Tracheomalacia is not an indication for laser therapy.

We have been impressed with the frequent incidence of malignant or benign lesions of the trachea or main-stem bronchi (or both) in symptomatic patients that go undetected by chest roentgenograms. Chest computed tomography, pulmonary function studies, and bronchoscopy may be necessary in unresolved cases. Current research for the detection of unsuspected endobronchial malignant tumors involves fluorescence imaging using injected hematoporphyrin derivative and krypton ion laser. In addition, photodynamic ablation therapy may be achieved by using an argon-pumped dye laser causing irreversible tissue oxidation.

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Lung Transplantation

NINE YEARS AFTER LUNG TRANSPLANTATION was shown to be feasible in dogs, the first human lung transplantation was done in 1963. In the next two decades, rapid developments in the field of solid organ transplantation took place, but the feasibility of lung transplantation was held back by difficulties with immunosuppression, bronchial healing, and infection. In spite of that, in the mid-1980s successful lung transplantation in humans became a reality in Toronto, Canada, where the first procedure was carried out. Since that time several centers have begun doing both single- and double-lung transplants with excellent results. It is now possible to offer lung transplantation in appropriately selected and treated candidates with a 60% to 70% one-year survival figure. There are several four-, five- and six-year survivors in the lung transplantation program from Toronto. The availability of more selective and powerful immunosuppressive agents including cyclosporine, OKT3, and other monoclonal antibodies is now making appropriate and selective immunosuppression possible. A better understanding of posttransplantation infection with advances in the diagnostic techniques has led to the rapid recognition of these infections and their treatment, leading to better results.

Current indications for single-lung transplantation vary slightly from center to center. At the moment, common indications for single-lung transplantation include pulmonary fibrosis, pulmonary emphysema from whatever cause, Eisenmenger's syndrome with simple intracardiac defects, and primary pulmonary hypertension. Double-lung transplantation is indicated in patients who have end-stage bilateral septic disease and thus require replacement of both lungs to prevent postoperative infection. Such diseases as cystic fibrosis and bronchiectasis are common indications of double-lung transplantation in 1990. The criteria for acceptance into the program include an appropriate psychosocial history and a lack of severe diseases in other organ systems.

Lung transplantation offers several advantages over heart-lung transplantation, but most particularly offers a feasibility of donation that does not occur with the more common and more established heart-lung transplantation. The organ allocation system in the United States provides that when a patient is on the waiting list for a status I heart, the organ will be allocated to that recipient. Because of this, there are frequently hearts donated with the lungs not being used, if only heart-lung recipients are being screened. When a lung transplant patient is on the waiting list, however, the lungs are then usable for that patient. It is possible to obtain from a single donor two single-lung transplant preparations and a heart transplant for a third patient. This has been carried out in several centers throughout the world.

At a recent seminar on lung transplantation, it became apparent that more than 200 lung transplantations have been done worldwide in the past year or two with the survival figures as mentioned. It is obvious that this is no longer an experimental procedure but one that is a therapeutic necessity in many patients who are otherwise condemned. In the future, we will see the indications widen and the procedure being done in many centers in much the same way as the clinical activity in heart and liver transplantation has changed in the past ten years.

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Transtracheal Oxygen Therapy

GIVING SUPPLEMENTAL OXYGEN has been shown to improve survival in persons with chronic obstructive pulmonary disease (COPD) who have significant hypoxemia. In the National Institutes of Health Nocturnal Oxygen Therapy Trial, patients with a Pao_2 of 55 mm of mercury or less (oxygen saturation $\leq$ 88%) when stable or a Pao_2 of 56 to 59 mm of mercury (oxygen saturation of 89%) in association with polycythemia or cor pulmonale were randomly assigned to receive either nocturnal oxygen or continuous oxygen therapy. Those advised to use oxygen continuously actually used it an average of 19 hours per day and lived considerably longer than those using oxygen only at night. Oxygen therapy can also enhance the exercise capacity in persons with hypoxemia.

Administering oxygen through a nasal cannula (nasal prongs) has been the conventional mode of delivery in outpatients, but the delivery of oxygen through a transtracheal catheter was reported almost a decade ago. Initial concerns that transtracheal catheters would commonly become infected and cause chronic irritation have not been confirmed. The advantages of the transtracheal administration of oxygen over that of a nasal cannula include eliminating